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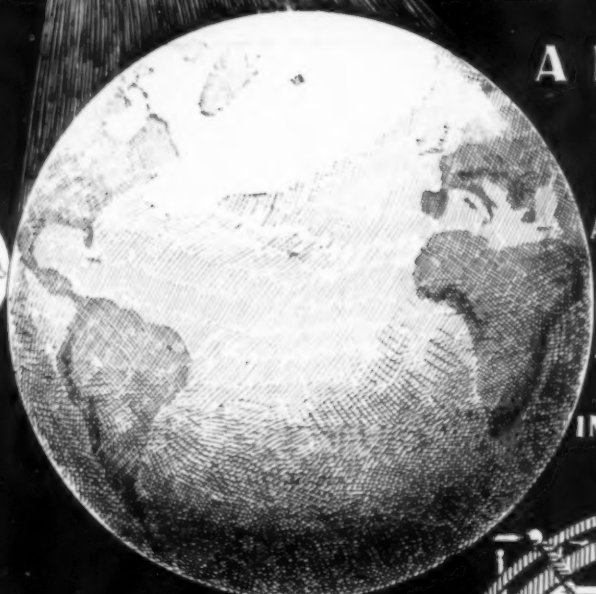
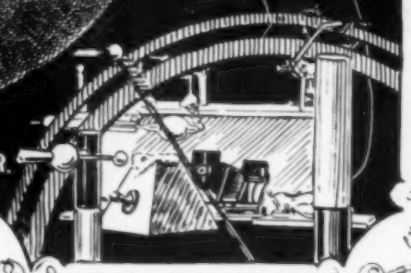
THE AMERICAN X-RAY JOURNAL



A MONTHLY DEVOTED TO THE PRACTICAL APPLICATION OF THE NEW SCIENCE AND TO THE PHYSICAL IMPROVEMENT OF MAN.



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NE FRONTI CREDE!

BY J. RUDIS JICINSKY, A. M., M. D.

There seems to be a plethora of new institutions which go before the public under the "scientific cloak" and which seek to uphold their interests in this way. Months ago there was in our town a quack, who advertised himself with a complete x-ray apparatus, pretending with the help of his second-hand machine to diagnose and certainly heal all acute and chronic diseases. What a shame!

The cause of real science is not a selfish one. It extends the hand of welcome to all new comers, who can and dare to point to a clean bill of truth and proof of the claim that they make. It, however, *can not tolerate any exaggeration, which have plans wholly at variance with common sense and legitimate effort.* This the public should know especially in regard to the unique discovery of Prof. Roentgen, which to the world of science gave new problems and new means of diagnosis to our profession. Admitting the fallacies of x-ray pictures, made in the undeveloped stage of this branch, it is the most attractive field for investigation. These investigations are going on and must bring some more and good results in a very near future. Labor omnia vincit!

Now as to the fallacies of x-ray pictures. These can be sometimes easily avoided, if we keep in our mind, the source of the x-ray and all the steps necessary in the photography of the invisible. One of the earliest experiments made in this country demonstrating a point of origin for the x-ray was made by Dr. Morton. (Vide: *The Electrical Engineer*, March 25, 1896). But the question still remains open, however, as to whether the x-ray actually springs into being at platinum or other anti-cathode placed independently within the tube. We know, that the x-rays are projected in all directions from that side of the reflector opposite to the cathode. Now in this beautiful green field of x-ray activity, we have to work, using our fluoroscope as often as we can and determining the shadows of an object opaque to the x-ray. We must not forget that our flat disk of platinum in the tube is at an angle of 45 deg. Such being the case, we observe either photographically or fluoroscopically that our object directly under the point of greatest intensity of the x-ray gives hardly a shadow. There is no question about it, that the shadows which are seen most beautifully, correspond exactly with the radiation from the disk of platinum in the tube.* This having in mind, we must always know the power of our x-ray, the distance of the tube from our object, the distance from

*The X-Ray, by Wm. J. Morton, M. D., New York, N. Y.

the plate, the duration of exposure and the angle at which the picture is taken. If we have to make correct diagnosis and produce an accurate picture, we must never be satisfied with one radiograph of the case, but make it also our duty to compare the picture of the injured part with the normal one. Therefore, to read correctly the lesson of an x-ray picture, *keep the obliqueness of x-rays always in mind, make it as nearly life size as possible to get sharply defined outlines, remembering that we are dealing with shadows only and use a proper dividing screen* (Dennison's etc.) for measurements and exactness of your pictures. While it is self-evident that different radiographs of the same case may show very differently, yet I would not say, that they should be inaccurate, when accompanied by a description of the relative positions from which they were taken and when all the rules given above were observed. Such a description could accompany each picture and being perhaps necessary in courts of law, would fortify us in every case against x-ray pictures which might prejudice a jury. I say might!

In the corner of each picture—make it a rule—we may note the power of the spark used, say "spark 8 inches"; the distance of the tube from our object: "Tube 4 inches"; the distance from the sensitive plate: "Plate 12 inches", duration of exposure: "Exposure 10 seconds", at the angle, at which the picture is taken "36 deg." or simply:

S 8, T 4, P 12,
E 10 seconds, 36 deg.

And if we mark also the right and left side of the object taken, there hardly could be a possibility for a great deviation and bringing such radiographs before the jury, we could show nearly always the same result on our plate and the same condition of the case either with the fluoroscope or screen direct or photographically right in the court room. We could produce before the jury the same kind of apparatus and knowing that a slight deviation in the angle of the object to the plate makes a difference, knowing the distances and duration of exposure in such a given case, we may have a good opportunity to show that the x-ray opens out a new and feasible method of proof and substantial evidence, especially in cases of irregularities or deformities of the bones.

To one, who has already had experience with the revelations of the x-ray in showing conditions of the bones far different from those assumed to exist by ordinary means of diagnosis, seems the alarm about the damage the x-ray may do the surgeon, altogether unnecessary, when we consider the strong advantages it has for him and in the near future will develop perhaps still greater accuracy. We know, that the x-ray detects and diagnosticates fractures and dislocations very good, it shows in given case, whether it is a fracture or a dislocation, or both together. We may then stop the growths of the calus and discover other deformities of the bones (tuberculosis, cancer, etc.), see the marrow cavity and look upon the progress of the union of the bone, after it has been set in splints, or even the correctness of the setting of the fragments may be determined and rectified. In anchylosis the x-ray is useful also and has inestimable value in detection of foreign objects in the body, same in diagnosis of phthisis pulmonalis,* intestinal obstruction, location of organs, study of anatomy, development of the bones, any enlargement, etc.

In fact, in the treatment throughout the broad field of surgery, the factor of prime importance is the diagnosis, which with the application of the x-ray, seems to be much easier and more correct. Just allow me to cite two eminent men:

*Proceedings Nebraska Med. Society: X-Ray in Diagnosis of Tuberculosis, by the author, June, 1898, Dr. Beclere, Dr. Blande and Dr. Teissier, Paris, etc.

Dr. Cole, before the fourth Annual Meeting of the American Academy of Railway Surgeons: "I believe that the present generation will see the x-rays and the fluorescent screen in practical every day use to such an extent that the surgeon will with the aid of these adjuncts, together with the use of progressive aseptic and antiseptic methods, obviate many terrors formerly attaching to the practice of bone surgery."† Prof. Senn in his "Recent Experiences in Military Surgery After the Battle of Santiago," on board the hospital ship

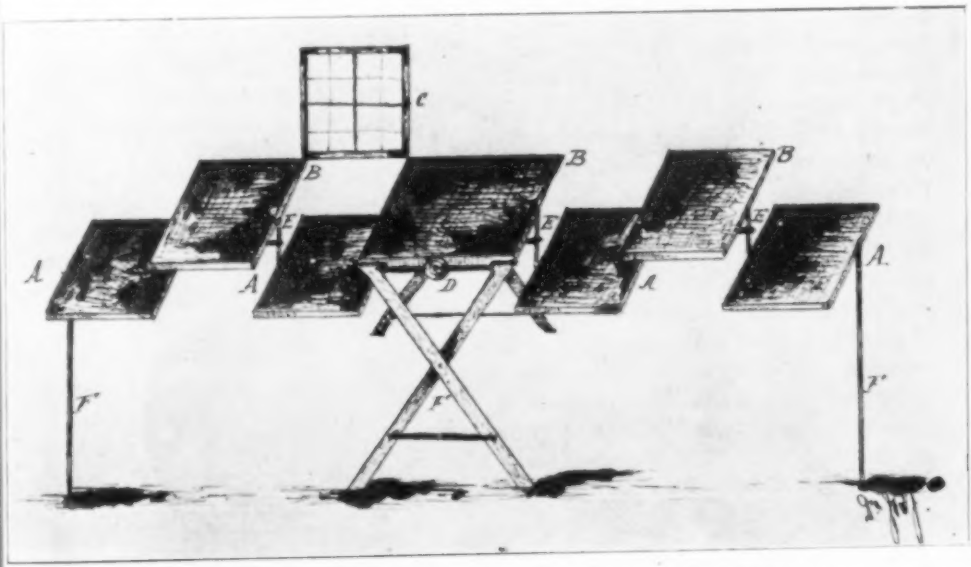


FIG. 1.—A, lower parts of the table; B, upper; C, dividing screen; D, screw; E, mechanism for moving the parts; F, the stand.

"Relief," says: "If, as is often the case, the whereabouts of the bullet is not known, its presence and exact location can be determined without any pain or any additional risks to the patient by the use of the x-ray. All of the bullets removed on board the hospital ship Relief were located in this manner. (Dr. Gray)." ‡

It must be stated that a great deal of refinement in operating the x-ray and its pictures is necessary, as well as a good deal of experience to "read the shadows" properly and identify them, but in suits for damage, I think we could accept radiographs made by a disinterested operator, especially those with proper description, as stated above and then demonstrate according to such given description the whole case to the jury in the court room if possible. But *never trust to appearances, find out yourself!*

Not long ago, I received a radiograph of radius¶, showing fracture in upper third, case examined by me too. There was no doubt, from ordinary physical examination, as to the existence of fracture, and yet it took nearly an hour with the fluoroscope to find it. After I received a description of the relative positions from which the picture was taken and used my operating table and the screen accordingly, I made in a few seconds and without any trouble an authenticated radiograph of that case, exactly same as the one shown to me. It is a picture very convincing and will sure

†The Journal A. M. A., May 28, 1898.
‡The Journal A. M. A., Nov. 12, 1898.

¶The original x-ray negative is now a court record.

have great weight with the jury. For such work I have constructed a simple but practical table, (Fig. 1). It consists of a stand (F), with a screw (D) to move the separate parts of the table (A B) and a dividing screen (C).

The parts of the table are marked in inches and show plainly how far we are from the tube with our object and the plate, giving also the angle at which the picture is taken. Such measures in connection with our dividing screen, should give us good results. Our dividing screen is marked with metallic R on one and L on the other side of the frame. Both letters must appear in our picture —no mistake about that—and our radiograph is then more complete. The operating table is so constructed to be tipped in any desired position on the Yale chair plan. The sensitive Carbut's plate finds its place on the under part of the table (A) and you will see that the nearer you bring the Crookes' tube to your subject, the stronger will be the effect of your x-rays, which easily can be followed and observed with the fluoroscope in your hand. Having such a table in our laboratory, we can measure all the distances necessary and verify those measurements very easily with our dividing screen.

CEDAR RAPIDS, IOWA.

This instructive article from the pen of Dr. Jicinsky should be read by all physicians interested in their own success in diagnosing. But there is one fact which should not be lost sight of in all x-ray work, viz.: The proof of the picture. All x-ray shadows are distorted. I say all. There is a normal divergence of the x-rays. This divergence is perpetual, constant and never varies. It is the same from all tubes under all conditions. The distortion is therefore always present. There is also distortion due to position. This may sometimes, possibly, be avoided—but rarely unless impervious right angle devices are used to correct it. In both instances the distortion can be corrected. It should always be corrected before the picture is taken. Unless this distortion, due to divergence of the x-rays and to position, is corrected the radiograph is not true and therefore dangerous evidence to the operator and also in the court of law. The Dennis fluorometer will correct these distortions with mathematical accuracy. No operator can conscientiously do surgery without this evidence and the time is not far distant when his knowledge in medico-legal cases will be put to the severest test.—ED.

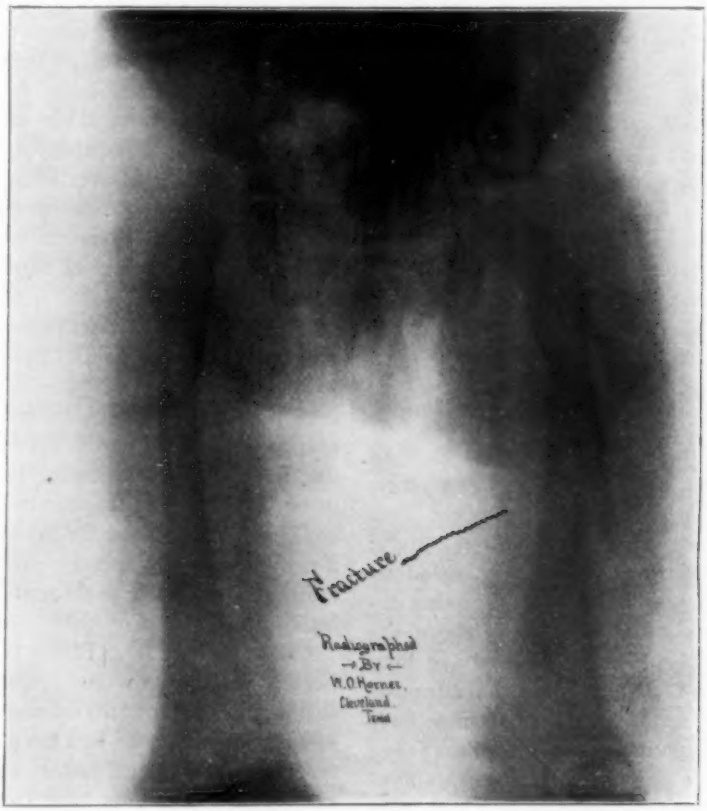
PROFITABLE RADIOGRAPHY.

This radiograph was taken by Prof. W. O. Horner, the eminent radiographer, of Cleveland, Tenn. The picture is of a boy of the age of three years, who

W. O. HORNER.

accidentally falling while playing, sustained a fracture of the right femur. The father of the young lad had presence of mind enough and good common sense to send for Prof. Horner at the same time that he summoned the aid of a surgeon. The Prof. immediately re-

sponded, and took his x-ray apparatus to the residence. An examination with the fluoroscope revealed the true condition of the injury. The surgeon being satisfied with the diagnosis, immediately set the fracture. After the work of the surgeon was done, a second examination was made to determine if the bones were in proper apposition; and then in order to retain a likeness of the same, Prof.



Horner made a two-minutes exposure, the tube 20 inches distant. The radiograph and examination with the fluoroscope revealed a satisfactory condition. Four days after this injury had occured, suspicion arose as to the possibility of an injury about the pelvis. The Prof. again made an exposure, including the pelvis and the fracture, and found that the suspicion of pelvic injury was not founded, but that there was considerable overlapping to the extent of about one inch of the fragments. This condition, which is so beautifully demonstated, was all that was necessary for the surgeon to employ means to overcome what would undoubtedly have been a permanent deformity.

The child has since recovered, and is now in perfect health, walking as though no injury had ever occurred. This is an able argument in favor of the universal use of the x-ray in fractures. Certainly no surgeon can be safe in setting fractures or dislocations without the aid of the human eye looking directly upon the site of injury.

Prof. Horner is recognized as one of the most competent experts in radiography, and the good people of his state,

appreciating this, call him "far and wide" for assistance. He is called upon by the railroad surgeons for nearly every railroad line that crosses the State of Tennessee, and by the better surgeons throughout the state.

Cases Illustrating the Value of the X-Ray in the Treatment of Fractures of Long Bones With Displacement.*

BY A. K. SHANDS, M. D., WASHINGTON, D. C.

In reporting these cases of fractures of long bones in which the use of the x-ray has been of inestimable value in diagnosing the exact position of the broken bones, surely a few remarks on the modern treatment of such cases will not be out of place, although I fear some may accuse me of being a little dogmatic in my enthusiasm on this subject. If there be such, I trust they may think me somewhat justified in the remarks which are to follow by the results that have been obtained in these cases.

No subject in the wide range of surgery has received more attention than that of fractures of bones. From time immemorial surgeons the world over have given the subjet great study; innumerable devices have been used by different surgeons, all with the same object in view—that of bringing about the best results. Many of these have long since been abandoned for the adoption of newer methods which in turn have likewise been dropped and others taken up. All of this goes to prove we have not yet found the method that will bring about perfect results in all cases. This has not been, however, to the detriment of the unfortunate individuals that have been the victims of such accidents, for after all the best method is the one that the surgeon knows best how to use. The number of deformities and cases of non-union that one sees as result of the treatment employed, as well as the great number of appliances that have been used, show how imperfectly the methods have answered the purpose. All surgeons, however skillful, have met with cases that have taxed their ability to the utmost, and, even after faithfully and conscientiously exercising all the skill at their command, have left living monuments to the glory of their failures.

The first and most important point in these cases is a correct knowledge as to the position of the fragments of the broken bones, before attempting reduction. Thanks to modern science, we have in the x-ray the most valuable aid in diagnosing the true condition of affairs in these cases that has ever been discovered, and its aid should be invoked in every case where there is the least doubt as to the true position of the fragments of the broken bone.

Every hospital that proposes to do this kind of surgery should be equipped with this machine. It would be an excellent routine practice to have photographs of every fracture taken after reduction and application of the splints, to be sure that the fragments are in the best possible position for union. These x-ray photographs can be perfectly well taken for this purpose through the dressings.

Cases II. and III. [Plates III.–VIII.] here reported were photographed through a plaster-of-Paris case, after an attempt at reduction had been made and it was thought that a proper approximation of the fragments had been accomplished, when the condition of affairs as represented by the photographs was found to exist.

After a correct diagnosis as to the position of the broken bones has been made, the first and most important step in the treatment is to bring about the best possible approximation of the broken ends. Many conditions militate against this perfect approximation so

*Read before the Medical Society of the District of Columbia, November 16, 1898.

much desired, such as a great separation of the ends; muscular action, which often makes it almost impossible to bring them together by manipulation and at the same time makes it impossible to hold the ends together, especially if the line of fracture is oblique. Interposition of soft tissues is another obstacle often encountered. All of this is more strongly emphasized by the numerous cases of non-union and union with deformity that we meet with than can be done by the words of any writer. Nothing can be more mortifying to a surgeon than a failure to get union, nor proclaim more loudly his lack of skill than to get union with deformity.

In these days of antiseptic surgery and almost perfect modern surgical technique, when the abdominal surgeon often enters the peritoneal cavity with impunity simply for the sake of explanation, why should one hesitate for a moment to cut down on fractured bones to satisfy himself with absolute certainty as to the relative positions of the broken fragments? In other words, all simple fractures with displacements that can not be easily reduced so as to obtain a perfect approximation should be converted into compound fractures by means of the knife, under the best possible antiseptic precautions. In doing this nothing is added to the severity of the case, and often just the opposite is the result, for, by so doing, blood clot and effusion can be removed which will put the surrounding tissues in a better condition to bring about repair to the injured parts. When the surgeon does this he has a perfectly clear field before him, he is then enabled to put the bones in the best possible position and fix them there by any means he may prefer, closing the wound for primary union. If this were done in all cases of fractures, both simple and compound, there would be fewer cases of non-union, and cases of union with deformity would be things of the past.

The writer does not mean to say that all cases of simple fracture should be so treated, for there are many fractures without displacement and many with slight displacement that can be easily reduced and held in apposition by simple means that will not require such radical procedure, but it is asserted that all cases that are difficult to reduce and those that have interposing tissues should be treated by open operation, and after approximating the broken ends they should be secured by some extraneous means, such as silver wire or kangaroo-tendon suture; better still, by leaving the drill in the bones. Later the drill can be easily removed after union has become sufficiently firm to prevent a recurrence of the displacement. When the line of fracture is oblique, the drill left in the bones projecting through the soft tissues is by far the most perfect means of fixing the bones in apposition. When the fracture is located near a joint, especially the elbow joint, which is beautifully illustrated by CASE III. it is impossible to keep the small pieces of bone in apposition with the longer bone without cutting down on the seat of fracture and securing it there.

CASE I. [Plates I. and II.] Age 13 years. Fell from a horse February 14, 1898, producing fracture at junction of upper with middle third of right femur. Position of fragments better shown by skiagraph No. 1 than can be done by any description. This case was referred to me by Dr. W. A. Gordon, of Orange county, Virginia, May 11th, about three months after the accident. The photograph of the case was taken at the Lionel Laboratory, Emergency Hospital, the day that I first saw the case. No definite history of the treatment that the patient had received was obtained beyond the fact that several attempts at reduction had been made by the family physician and that he had been treated

on an inclined plane at first, and later the limb had been put up in plaster-of-Paris.

of three months' confinement in bed. There was marked atrophy of right limb which rotated outward to 45 deg.

PLATE I. CASE I. Fracture of femur at junction of upper and middle thirds.

Upon examination I found the general condition of the patient bad, the result

Voluntary motion *nil*; passive motion was resisted by marked muscular spasm

and produced great pain. The limb was two inches shorter than its fellow.

Operated May 12, 1898. A la al incision about five inches long was made over the seat of the fracture. Fragments of the bone were found to be united by firm fibrous union in the overlapped position shown in the photograph. Bones were separated; a transverse section of the ends was made. It

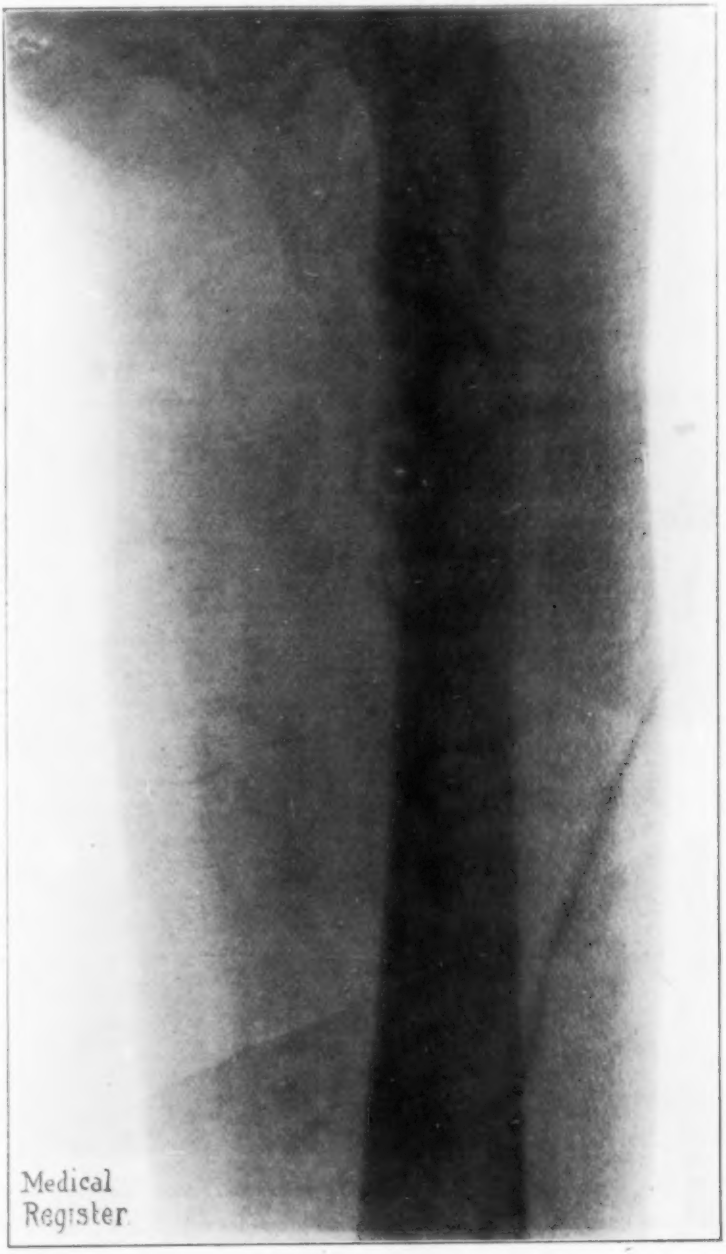


PLATE II. CASE I. Six weeks after operation

required considerable force to extend the leg to obtain an opproximation of the fragments, the result of muscular contraction of three months' standing.

nipples. Temperature reached the highest point, 100½ deg., afternoon after the operation; it dropped to normal on third day, where it remained. Patient

PLATE III. CASE II. Fracture of right tibia and fibula. Antero-posterior view.

Silver wire was used to hold bones in position. Wound closed with cat-gut sutures; no drainage. Antiseptic dressing applied and limb put up in a plaster-of-Paris spica extending from foot to the

had considerable pain during first two days caused by the stretching of the muscles; it was relieved by moderate doses of morphine. Plaster-of-paris removed at end of six weeks; primary

union perfect; bone firmly united. The following day the patient was allowed up and around on crutches, which were used for about four weeks, when one crutch only was used for two weeks. Twelve weeks after day of operation patient was able to walk with almost perfect gait, without support. Final measurements made the last time I saw the patient revealed the fact that limb was less than 2-8 of an inch short. At present the patient is walking to school one-half mile from his home.

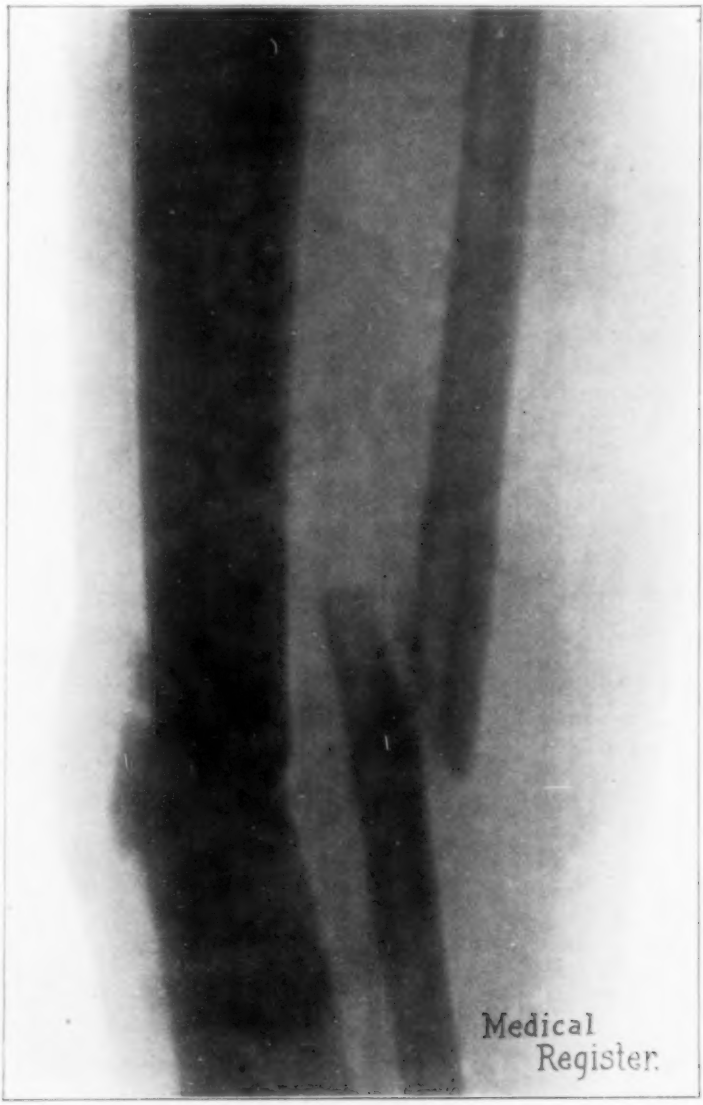


PLATE IV. CASE II. One-half anterior and external view.

CASE II. [Plates III.–VI.] Age 22 years. Sustained fracture of both bones of right leg, February 2, 1898. Came under my care April 28. Operation on April 28, 1898. Anterior incision about

five inches long made parallel to crest of tibia and about ½ inch to outer side. Space between ends of bones filled with dense fibrous tissue. Transverse section of ends of tibia made and when approximated were held by a drill left in projecting through the dressing. The fracture of the fibula being an oblique one, the edges were freshened and held together by a kangaroo-tendon suture. Wound was closed without drainage; antiseptic dressings applied and plaster-of-Paris case put on extending from the toes to middle of the thigh. At end of three weeks the drill was removed and wound inspected, when primary union was found to be perfect. Six weeks after the operation the plaster-of-Paris

PLATE V. CASE II. Six weeks after operation.

case was removed, and another extending from just below the knee to the ankle was put on and patient allowed up on crutches. Solid bony union was delayed in this case, it being about four months after the operation before the crutches could be discarded. This was due to the patient's general condition being very poor. October 28, 1898, photograph [Plate VI.] was taken which shows good, solid, bony union. Patient walks well unaided, leg about three-eighths of an inch short.

In both these cases it should be noted that the plaster-of-Paris was extended well beyond the joints, above and below the seat of the fracture, which produced complete immobilization of the entire limb. This is an excellent safeguard to prevent any danger of the fragments of bone becoming displaced, and at the same time adds very much to the com-

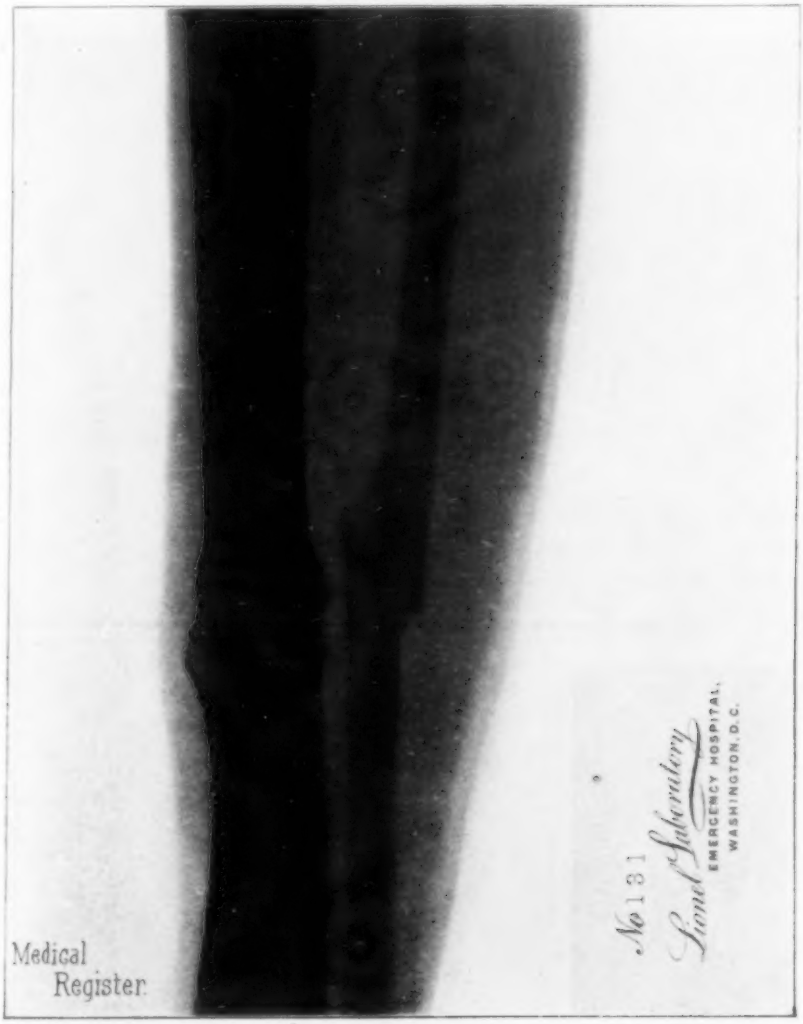


PLATE VI. CASE II. Six months after operation.

fort of the patient, by putting at perfect rest the muscles of the injured limb, and thereby preventing painful spasm of the muscles.

lation at reduction of the fracture was made and arm put in a plaster-of-Paris splint. On the thirteenth day after injury x-ray photograph taken through the

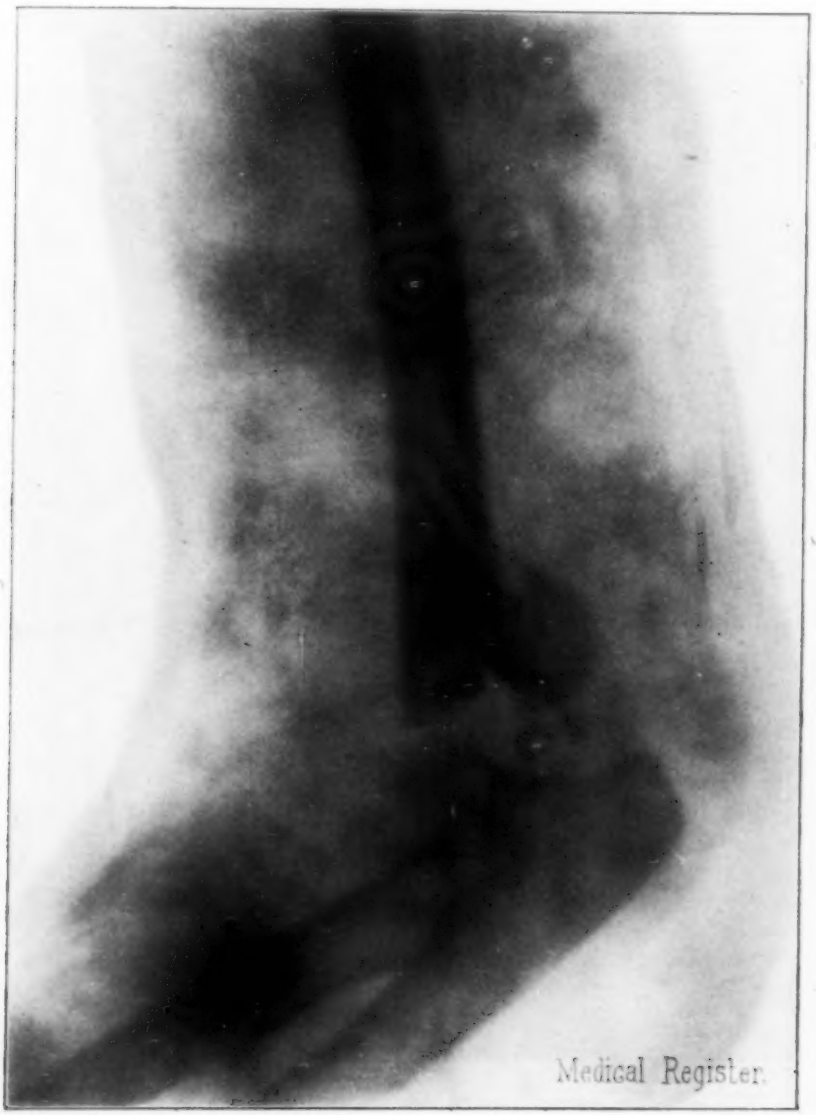


PLATE VII. CASE III. Fracture of right humerus one inch above elbow. Thirteen days after the fracture. Skiograph taken through the plaster-of-Paris dressing.

CASE III. [Plates VII. and VIII.] Age 9 years. Fracture of right humerus one inch above elbow, March 4, 1898. On day of the accident forcible manipu-

plaster-of-Paris dressing, showing that no reduction of the fragments had been accomplished.

March 25th, three weeks after the ac-

cident, Dr. W. T. Bull, of New York, operated on the case, and to him I am indebted for the privilege of reporting the case and also for the following notes regarding the technique of the operation.

Through an open incision on posterior aspect of the elbow, the position of fragments as shown in plate VII. was found to exist. The lower fragment was tilted inward and upward and so situated as to prevent normal flexion of forearm on arm; fragments were sharp pointed. There were very dense adhesions which glued everything together, although there was motion between the ends of the fragments which were pried apart and traction made upon the elbow to reduce the deformity, but with no success

PLATE VIII. CASE III. Side and front views, two months after operation.

The ragged and pointed edges were cut square and holes drilled through. After the fragments were approximated they were held in position with kangaroo-tendon sutures. Wound closed except at lower end, where a piece of drainage

gauze was left in. After the application of an aseptic dressing, arm was put in a plaster-of-Paris case with forearm slightly flexed. Very little reaction followed; gauze removed on third day and repacked for forty-eight hours longer; this was gradually removed. With exception of a small, discharging sinus for a few weeks the recovery was uneventful.

The second photograph [Plate VIII.] of this case taken two months after the operation give side and front views of the elbow and show the articulating surface to be in perfect position.

This case has recently been examined by the writer, that is to say seven months after the operation. The motions of the elbow are practically perfect. Extension may possibly be limited by three or four degrees. In closing this report I wish to thank my friends, Dr. T. Ritchie Stone and Mr. W. H. Merrill, for the excellent x-ray photographs illustrating this article, which were taken at the Lionel Laboratory, Emergency Hospital, Washington, D. C.

1328 New York Avenue, N. W.

—*Medical Register*, Dec. 15, 1898.

Through the courtesy of E. C. Levy, M. D., Editor of the *Medical Register*, we were enabled to procure these electros.

Recovery of Roentgen Ray Tubes. Machado. *Comptes Rendus*, 126, p. 1341; noticed briefly in *Science Abstracts*, Sept. *Electrical World*, N. Y.—He wraps the tubes surrounding the stem of the cathode with a flexible metallic sheet of tin, lead or platinum, or surrounds it with an insulated coil of copper wires. With this arrangement it is claimed that exhausted tubes recover in a few seconds. No further description is given in the abstract.

The usefulness of the Dennis Fluorometer has been recognized in Europe and several complete outfits have recently been purchased for x-ray operators on the continent.

LONDON ITEMS.

J. M. BARBOUR, M. B.,
Librarian Roentgen Society, London, Correspondent.

"Traite Pratique de Radiographie et de Radioscopie A-Londe," Paris.—This is a practical work without any introduction of electrical methods. To English and American readers the work presents some errors and occasional omissions. The only allusion to workers other than French, is in regard to Prof. Silvanus Thompson, to whom they erroneously ascribe the inception of the focus tube. The employment of tungstate of calcium for screens is omitted, and further it is surely inaccurate to affirm that *the size* of the anti-cathode governs the definition of the tube. The chief merits of the book are its medical chapters.

"Of Traumatic Injuries, Especially Those Depending Largely on X-Ray Application for Their Elucidation."—Dr. Poland's treatise may well be regarded as the leading publication of the year, if not the foremost work of its kind. Some idea of the magnitude of the work involved may be gathered from a collection of over 700 cases wherein each is carefully recorded, classified, deductions drawn, and where possible, illustrated by skiagrams. The work is arranged in four parts—the first treating on traumatic separations in general. The second and third on those pertaining to upper and lower limbs respectively, and finally those of the vertebrae and ribs are dealt with. Under each heading, the age, sex, varieties, complications, and treatment are fully given, together with drawings of special appliances where helpful. Nineteen skiagrams of the hand at ages varying from 1 to 17 years are given, serving to illustrate the relations of the epiphyses at their respective ages. This is well embraced here, though also published in a separate volume, as "The Skiagraphic Atlas" of the bones of the

hand and wrist. The entire volume is extremely well got up and is a mine of information on a subject, the literature of which has hitherto been most scattered.

"Clegg's International Directory of Booksellers." Rochdale. 6.—The edition for 1899 is a wonderfully cheap compendium of all that is necessary for the average bibliophile. The foreign section and the list of dealers in every variety of book hobby is remarkably complete.

A discussion on "Dermatitis in Relation to Roentgen Work", was held at the Roentgen Society on the 6th inst. Mr. Ernest Payne and Dr. Walsh read each a paper dealing with some of the accepted theories and some recorded cases. The exact factor in determining the destruction on tissues remains an unsettled one. X-rays, other rays, brush discharges, abnormal conditions of the skin, individual susceptibilities, had each their advocates. The employment of metal and other "masks" around the exposed parts occupied some discussion, but the modus operandi by which these exercised protection was not agreed upon. It is to be regretted that only some half dozen replies were received in response to a largely distributed "form" requesting tabulated information from those who had experience of x-ray burns. This limited testimony, however, was quite in accordance with the general experience of workers, viz.: That small coils with long exposures, and "soft" (low vacuum) tubes, were the usual conditions under which the damage occurred. However, under improved technique, long exposures are no longer necessary, and in future such "burns" may be regarded as almost outside the pale of possibility.

In a recent lecture before the Royal Photographic Society, Dr. Russell discussed the manner in which certain bodies act in the dark on a photographic plate. The principal substances dealt with were printer's ink, in contact with or at a distance from a photographic plate, oils, copal varnish, turpentine, wood and metals. Dr. Russell is of opinion that peroxide of hydrogen is the cause of many of the singular photographic phenomena thereby produced.

A still further singular employment of the x-rays has been suggested. In the process of winding silk from the cocoon it is necessary to place it in hot water whereby the grub is killed. A rough guess in weight is the only way of determining between the male and female. As the latter contains—on account of its eggs—much more mineral matter than the male, x-rays may be employed to distinguish the sexes so that the females, valuable for their eggs, may be saved.

In Germany the use of the Roentgen rays has led to very satisfactory diagnosis being arrived at in cases of swollen feet, a complaint very frequently met with among infantry soldiers, more particularly after days of weary and protracted marching. This swelling is frequently unaccompanied by any outward and visible wound. An examination made with the help of the Roentgen rays not infrequently shows the trouble to be caused by a fracture of the middle metatarsal bones. Among the soldiers of the mounted branches of the army bone fractures are not infrequent. To enumerate: damaged shoulders, elbows, hips and ankles. Again in cases of malingering, or alleged malingering, the rays have been equally successful. The following case shows to what curious devices men will sometimes resort with the object of thus freeing themselves from military service. A cavalry soldier reported himself in hospital as suffering from inflation of the skin of the third and fourth fingers, which had—he affirmed—been caused by the bite of a horse a week previously. After undergoing an examination at the hands of

the regimental surgeon, who was much puzzled by some of the symptoms, the part was x-rayed. The result showed five needle-shaped foreign substances embedded in the flesh of the hand. The man then admitted having himself inserted the two smaller ones during a period of arrest that he had recently undergone. Of the three larger ones he emphatically denied all knowledge. He himself afterwards secretly withdrew the two smaller needles. The other three had to be removed by an operation. These substances proved to be strong pins which had had their heads broken off before being inserted. One of these was found to be embedded in the interosseous muscles.

In another recorded case, the muzzle of a revolver was discharged opposite the apex of the heart. The surgeons had every reason to suppose that the heart itself was injured. On a radiogram being taken it was seen that the bullet had become fixed in the lower part of the pericardium.

Dr. Hoffman records an interesting case of a shoemaker aged 38 who was shot on December 14, 1895. The shot was fired at a distance of thirty centimetres and struck the unfortunate man in the throat just over his shirt collar. After a short interval of consciousness, he fell down senseless and so remained for four hours. On regaining his senses he became conscious of a feeling of extreme cold and a great rigidity of the whole body. His head remained quite clear. At the same time he felt extreme pain in the throat. For a long time he remained bed-ridden and semi-unconscious. With the exception of the head and neck, nearly all the muscles seemed paralyzed—he being only able to move his toes and fingers. For the first fortnight evacuation only took place after the use of an enema, and micturition after using a catheter. The use of his limbs gradually returned—the right more quickly than the left. His left arm also recovered very slowly and still remains weak and stiff. A curious symptom was recorded; any part of the body (with the exception of the throat and face) that was touched with anything cold experienced a curious prickly sensation resembling the application of a mild electric current. At no period was a loss of feeling present. Evacuation and micturition became normal. The man recovered entirely with the exception of a slight lameness of the left leg, and a slight stiffness of the left arm.

An examination made with the help of the Roentgen rays clearly showed the bullet lodged in the vertebral canal at the height of the fourth cervical vertebrae. This shows that a bullet may pass through the throat from front to back, into the vertebral column, and even through and into the vertebral canal without injuring any vital organs. The result of such an accident being nothing more serious than the partial and temporary paralysis of the limbs.

At a recent meeting of the Royal Society, Mr. C. J. R. Wilson, read a paper showing the results of his experiments in the comparison of x-rays with the rays from uranium, with ultra violet rays, sunlight, metals in contact with the gas under examination, and further with the modifications brought about by electricity. The net results of Mr. Wilson's work, which lay in the effect upon the condensation of aqueous vapor into fog or visible drops of these various radiations, conclusively showed that these radiations were all distinct and different and not to be confounded with one another, there having been at one time, a strong tendency to show a similarity of constitution through similarity of effect.

In the annual report of the Paris Observatory for 1897, we learn that a special study of the cathode rays has re-

cently been made. These investigations were inspired by the theory, in accordance with the conception of M. Deslandres, which assimilates the rays of the solar corona to the cathode rays.

Firstly, it was a question of if the the reciprocal actions of the cathode rays and of the conductors could explain the curved rays of the corona. The ollowing are the initial results obtained: A cathode ray is deflected by means of a metallic wire situated in the interior of the vacuum tube and connected with a conductor on the outside. It becomes devided into unequally deflected rays, in the same manner as the prism deflects rays of lights by reuniting these deflections the "Cathodic Spectrum" is obtained. Who knows if the phenomenon of the crepuscular lights (twilight), such as has been authenticated, will not be explained in this manner?

A simple cathodic ray corresponds to a simple electric oscillation (vibration). At a very low pressure, widely deflected simple rays alone exist in the cathode spectrum and furnish the greater part of the x-rays. At that moment, the corresponding electric oscillations are those of the vacuum tube itself, which vibrates in its own period.

Mons. Deslanders and Millochan have succeeded, basing their opinions on these results, in giving a very clear explanation of the tail of a comet.

Radiograms taken at different stages of Coxalgia show the following lesions: atrophy of the femur and of the pelvis on the side corresponding to the coxalgia; light color of the whole femur indicating lesions of the full length of the bone; deep color indicating fungi or the presence of cold abscess; spongy bone with small anfructuous cavities; disease of the neck of the femur; lesions of the cotyloid cavity; dislocation, or partial dislocation of the head of the femur.

By following these deductions, an exact diagnosis of the affection and its peculiarity may be made, coxalgia may be distinguished from osteo-myelitis, periarticular lesions, and the different varieties of arthritis.

Fluorescent Screens For X-Ray Work.

A contributor to the *British and Colonial Druggist* says, from personal experience, that effective fluorescent screens may be made by the amateur, and that a material reduction in cost is thereby effected. Calcium tunsgate he regards as a very fair material, and a salt of uranium he thinks very good (the particular salt not being mentioned). The method of making the screen is as follows: Take a plate of glass, say, 8½ by 6½ inches, make a mask of stout paper, with an opening 7 by 5; wet this mask with glycerine or mucilage of gum arabic and place it over the plate: cover the plate with collodion or varnish, or mucilage (with a little glycerine added), and sift the powdered salt quickly and evenly all over the surface. If vellum, parchment, cardboard, or ebonite be used as the support, one may put a coating on both sides, and thus even up any inequalities of deposit; but with a glass support the same advantage will not accrue. Having got a good thick coating of powder, the mask is removed, but this does not matter very much; it has served its purpose to give a clear edge to the coating. The coated side, which must face the tube, if glass is used, is covered with a piece of thin black celluloid, or ebonite, or opaque paper. With vellum, parchment, or paper, there should still be a black shield between the tube and the fluorescent salt; but the latter should be left uncovered, and facing the eye. The platinocyanides

may be used in the same way, though they do not powder or sift so finely; or they may be mixed with varnish, and spread over a glass or vellum surface. The trouble is to get a really even coating, but with anything but glass one can apply a roller pressure, and thus smooth down any unevenness. The easiest way to get an even coating, according to the author, is to use a vehicle of paraffin and petrolatum. Equal parts of each are melted together, stirred until cool, and the powdered salt (about 2 drachms for a 7 by 5 screen) rubbed on a slab with just enough of the wax mixture to make a workable mass, which is spread by means of a long, straight spatula. An undesirable feature is the liability of the mixture to "run" in a heated atmosphere, but at normal temperature no trouble whatever is encountered. The author, whose article is abstracted in *Scientific American*, mentions that in addition to its value as a means of direct observation, the fluorescent screen reduces the time of exposure in making a skiagraph, being placed beneath the plate when exposed. In conclusion, the author remarks:—"Of course, it must be understood that even the best and most costly screen will not fluoresce to any extent if the rays are being delivered poorly and intermittently; it will not compensate for a poor and weak electrical discharge and a faulty tube. As a gauge by which to estimate exposures, I consider a good screen very valuable. With practice one becomes as intimate with the capabilities of his 'tubes' as a photographer with the capacity, as regards covering power and rapidity, of his lens."—*Electrical Review*, London.

CONSERVATIVE surgery is the pride of the modern Esculapian on the field of battle. The stacks of amputated limbs that constituted such a gruesome and constant sight after every great battle during the Civil War, will never be seen again on the field of battle where modern surgery is practiced. Aseptic surgery has driven out of our military hospitals the four greatest enemies of the wounded soldier: hospital gangrene, secondary hemorrhage, pyemia and erysipelas. The probe, an instrument of torture, danger and fallacy, has been abandoned for the x-ray in locating bullets lodged in the body.

Extract from "Esculapius on the Field of Battle," delivered at the banquet of the Inter-State National Guard Association, Dec. 14, 1898, by Dr. Nicolas Senn.

The Value of the X-Ray in Military Practice.

The use of the probe as a diagnostic instrument in locating bullets in modern military service has been almost entirely superseded by dissection and the employment of the x-ray. If from the nature of the injury and the symptoms presented the bullet is located in a part of the body readily and safely accessible to the knife and it is deemed advisable and expedient to remove it, this can often be done more expeditiously and with a greater degree of certainty by enlarging the track made by the bullet than by relying on the probe in finding and on the forceps in extracting the bullet. If, as is often the case, the whereabouts of the bullet is not known, its presence and exact location can be determined without any pain or any additional risks to the patient by the use of the x-ray. All of the bullets removed on board the hospital ship Relief were located in this manner. Dr. Gray, an expert in skiagraphy, who has charge of the scientific work of the floating hospital, has been of the greatest service to the surgeons in enabling them to locate bullets and in guiding them as to the advisability of undertaking an operation for their removal.

His large collection of skiagraph pictures will also furnish a flood of new light on the effects of the small caliber bullet on the different bones of the body. Dr. Gray's work will constitute an essential and enduring corner-stone of a much-needed modern work on military surgery. The skiagraph has enabled us to diagnosticate the existence or absence of fracture in a number of doubtful cases in which we had to depend exclusively on this diagnostic resource. In fractures in close proximity to large joints the x-ray has been of the greatest value in ascertaining whether or not the fracture extended into the joint. In one case of gunshot wound at the base of the thigh in which the bullet passed in the direction of the trochanteric portion of the femur, opinions were at variance concerning the extent of injury to the bone. Some of the surgeons made a diagnosis of fracture while others contended that there was no fracture but believed that the bullet had made a deep groove in the anterior portion of the bone and had possibly opened the capsule of the joint at the same time. The x-ray picture clearly demonstrated the absence of fracture and the existence of a deep furrow with numerous fragments on each side. The x-ray apparatus also proved of the greatest practical utility in showing the displacement of fragments in gunshot fractures of the long bones, which enabled the surgeons to resort to timely measures to prevent vicious union. The fluoroscope has greatly added to the practical value of skiagraphy. In the light of our recent experience the x-ray has become an indispensable diagnostic resource to the military surgeon in active service, and the suggestion that every chief surgeon of every army corps should be supplied with a portable apparatus and an expert to use it, must be considered a timely and urgent one.—*Journal of the American Medical Association*, Nov.

The Rational Treatment of Grippe.

The necessity of a powerful eliminant in every prescription for grippe is self-evident. While antipyretics and antiperiodics may somewhat stimulate the excretions and relieve congestion, thereby controlling certain features of the disease, a complete cure can not be expected until the grippe poison is thoroughly eliminated and the diseased organs enabled to resume normal functions.

The successful treatment of grippe depends upon the thoroughness of the remedy employed, hence we ask why temporize with antipyretics and antiperiodics when Tongaline always secures prompt and efficient as well as permanent results.

The internal use of Tongaline Liquid taken at short intervals in hot water, washed down with copious draughts of hot water, may be supplemented by its local application to the inner parts of the thighs and to the abdominal surfaces. Or as grippe invariably renders the stomach irritable and the nerves sensitive, the disturbing effects of internal medication can be entirely avoided by the external use of Tongaline Liquid alone.

In fact when the system is thoroughly under the influence of Tongaline, the progress of the grippe is arrested and as a result there is immediate recuperation, followed shortly by a perfect cure.

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AMERICAN X-RAY JOURNAL.

Upbraiding the Doctor.

Dr. Samuel Wolf, Physician to the Philadelphia Hospital, and Neurologist to the Samaritan Hospital of Philadelphia, presents among others, a case which is of special value at this time. He says:—"The entire experience of the writer with antikamnia is not confined to

the series of cases on which this paper is based, although its previous use had been limited to a few prescriptions, and those in cases where it was given after the usual routine had been exhausted. It is, however, to a striking result in one of these instances, that the incentive to investigate more fully, is to be largely attributed. A man of 42, in the course of an attack of LaGrippe, was enduring extreme torture from the pain of a trigeminal neuralgia. The second ten grain dose of antikamnia gave such complete and permanent relief, that my patient, a druggist of large experience, upbraidingly asked me, 'Why didn't you prescribe this remedy before?' "

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